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mens on which it is based were collected by Dr. A. Rehmann in Natal and the Transvaal, South Africa.

*Psoralea esculenta*. Dr. T. F. Wilcox, U. S. A., sending specimens of the "Pomme Blanche" states that it is known about Ft. Niobrara, Neb., as "Bread-root," "Tim-chilla" and "Indian Turnip."

### Reviews of Foreign Literature.

#### *Structure of the vittæ in the fruit of Umbelliferæ.*

In several numbers of the Bot. Zeitung for May and June is a series of short papers by Arthur Meyer on the origin of the partition walls which occur in the intercellular spaces of the fruit of the Umbelliferæ. These cavities are technically known as vittæ and contain the volatile oil which gives the aromatic flavor to many fruits of this order.

It has been noticed by other investigators that these oil cavities were lined by a certain substance, which in some cases has continued through the cavities in the form of partition walls. As the intercellular spaces are not supposed to contain protoplasm, out of which walls may be built in the regular normal manner, the author has undertaken to determine the origin and function of the walls peculiar to these passages. He first gives the morphology and chemistry of the wall as found in ripe fruits. In nearly all cases besides that lining the cavity, partition walls occur. These differ in form and shape in different species. As to their chemical nature, the results of the tests made incline one very strongly to the opinion that they are mainly formed of suberin. The development of the wall is followed from the moment when the secretions from the walls surrounding the cavity are given off in the form of a watery fluid together with tiny oil drops, to the formation of the perfect wall. This watery fluid, he claims, is the foundation of the wall, and that it differs entirely from protoplasm; or as he puts it, from cytoplasm as used by Strasburger. That is, protoplasm without nucleus or chromatophores.

Special emphasis is laid on this point, as various other writers are inclined to consider this secretion as protoplasm which has penetrated the walls and found its way into the intercellular spaces, in the same manner in which the fine threads of protoplasm continue from cell to cell. Among these authors are mentioned Ber-

thold and Russow. In all the experiments tried, it is claimed that the substance of these walls, in both chemical and physical action, appeared entirely unlike protoplasm.

In regard to their biology, he concludes that this is a special arrangement for the preservation of the species. This appears from the fact that the ordinary wall allows these oils to escape very easily. Examples are given where volatile oils escape with great rapidity through the ordinary walls when the fruit first becomes dry. It is well known that the fruits of the Umbelliferae such as fennel and caraway seeds, as we call them, retain their pungent aromatic odor for a long time, which he claims would be quite impossible were it not for the protection afforded the oil by the suberous nature of the walls in which it is held. Again it is also well known that the oil of these plants has an injurious effect on many insects, birds, etc., when eaten by them. Therefore these suberous walls must be regarded as a special arrangement for the preservation of the species. E. L. G.

#### Index to Recent American Botanical Literature.

*Acacia flexicaulis*. C. S. Sargent. (Garden and Forest, ii. 400, fig. 123).

*Algæ—The Fresh Water—and their Relation to the Purity of Public Water Supplies*. Geo. W. Rafter. (Eng. and Build. Rec. xx. 115, 116-129, 131).

Abstract of a paper read before the Am. Soc. Civ. Eng., May 1, 1889.

*Asa Gray*. Andrew Taylor. (Trans. and Proc. Edinburgh Bot. Soc. xvii. 346-350).

An obituary notice read before the Edinburgh Bot. Soc., May 10, 1888.

*Aster Lindleyanus*. (Garden and Forest, ii. 448, Fig. 127).

This fine species has recently been detected in Mt. Desert by Mr. Rand.

*Bignonia radicans*. L. Greenlee. (Vick's Mag. xii. 270, illustrated).

*Catalpa and Paulownia—The Leaves of*. A. C. Stokes. (Microscope, ix. 225-231).